200 Area Groundwater Management

Background:

The 200 Area Groundwater Management Project has the overall goal of long-term protection of groundwater resources. Under the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA) a pathway for performing accelerated Interim Remedial Measures (IRM) for selected contaminant plumes is being accomplished. The groundwater management project is responsible for integrating with the Groundwater/Vadose program for groundwater monitoring activities and integrated planning efforts across the Hanford site.

Primary sources of groundwater contamination were liquid waste disposal structures (e.g., cribs, trenches, and ponds). Major contamination plumes being treated under interim actions are the carbon tetrachloride, uranium and technetium-99. Characterization and remediation strategies for the carbon tetrachloride contamination in the vadose zone are being accomplished under the Groundwater Management Project. This includes one source OU, 200-PW-1 (formerly 200-ZP-2) in the 200-West Area.

The 200 Area encompasses the 200 West and 200 East Areas. Four groundwater OUs are designated for the 200 Areas:
200-UP-1 Operable Unit (OU) and 200-ZP-1 OU in the 200 West Area, and 200-BP-5 and 200-PO-1 in the 200 East Area. Long-term monitoring is the selected action being conducted for 200-BP-5 and 200-PO-1 OUs.

200-UP-1 Operable Unit: This OU underlies the U Plant and S Plant, located in the southern half of the 200-West Area. The OU addresses the contamination identified in the aquifer soils and groundwater within its boundary. Over 25 contaminants are known to have exceeded drinking water standards in the OU. An interim action record of decision (ROD) for the 200-UP-1 OU (EPA, et. al. 1997) selected pump and treat for remediating uranium and technetium-99 in the groundwater. A single extraction well removes groundwater for the plume and is transported from the well head at the 200 West remediation site to the Effluent Treatment Facility (ETF) in the 200 East Area for treatment.

200-ZP-1 Operable Unit: This OU underlies the Z Plant and T Plant, located in the northern half of the 200 West Area. The OU addresses the contamination identified in the aquifer soils, and groundwater within its boundary. The contaminants of concern carbon tetrachloride, chloroform, and trichlorethylene. An interim action ROD (EPA, et.al.1995) requires remediation of the greater than 2000 ppb carbon tetrachloride plume northwest of Z Plant (excluding the T Plant plume). A groundwater pump and treat system consisting of six extraction wells and five injection wells removes carbon tetrachloride, chloroform, and trichlorethylene.

200-PW-1 Operable Unit: The 200-PW-1 OU addresses contaminated soils associated with Z Plant operations. An Expedited Response Action (ERA) with the objective, as state in the Action Memorandum, is to mitigate the threat to site workers, public health, and the environment caused by the migration of carbon tetrachloride vapors through the soil column and into the groundwater and to reduce the mass carbon tetrachloride. Soil vapor extraction (SVE) is being

performed to remove carbon tetrachloride from the vadose zone beneath the 216-Z-9, 216-Z-1A, 216-Z-12 and 216-Z-18 waste sites.

Current Status:

Continued groundwater and vadose zone actions have removed groundwater contaminants through operation of two pump and treat systems and one vapor extraction system.

Planning is underway to add additional extraction well to the 200-UP-1 pump and treat system to enhance uranium and technetium removal.

A groundwater monitoring well will be installed in FY02 within the fence-line of the Plutonium Finishing Plant to characterize carbon tetrachloride in the vadose zone and groundwater in this area. No monitoring wells currently exist within this area.

In conjunction with EM-50, an Innovative Treatment and Remediation Demonstration (ITRD) program is in place to support the evaluation of characterization technologies for the investigation of dense non-aqueous phase liquids (DNAPL) and the evaluation of enhancements to the 200-ZP-1 pump and treat system. This ITRD program is also assisting with the evaluation of enhancements to the 200-PW-1 SVE system for carbon tetrachloride removal from the vadose zone.

Working with EM-50 to evaluate uranium transport in the saturated and unsaturated sediments in the 200-West Area to determine enhancements to or alternatives for the 200-UP-1 pump and treat system.

A work plan to implement the remedial investigation/feasibility study for the 200-PW-1 operable unit is in preparation. The work plan will address the vadose characterization of the waste sites and the dispersed carbon tetrachloride plume.

Issues:

None.

Accomplishments:

200-UP-1 Operable Unit: From inception (1994) to date, approximately 393.7 liters of groundwater have been treated at ETF. A total of 67.3 g of technetium-99 and 114.9 kg of uranium have been removed. The high technetium-99 concentration portion of the plume is being hydraulically contained.

200-ZP-1 Operable Unit: From inception (1994) to date, approximately 1.25 billion L of groundwater have been treated and 4,570 kg of carbon tetrachloride removed. The greater than 2000 ppb carbon tetrachloride portion of the plume is being contained.

200-PW-1 Operable Unit: From inception (1991) to date, approximately 87,780,000 cubic meters of soil vapor have been treated, removing 76,816 kilograms of carbon tetrachloride.